PHYS 4392 ***More Practice Test 1 problems***

1. Consider a solid sphere of radius R with uniform volume charge density ρ

(a) Find the electric field $\boldsymbol{E}$ everywhere **[3 points]**

(b) Does the result behave correctly far from the sphere (explain)? **[1 point]**

(c) Use the result for $\boldsymbol{E}$ to find the potential V everywhere. **[3 points]**

(d) Does the result behave correctly as you go from the surface to infinity (explain)? **[1 point]**

(e) Find the electrostatic energy stored **[3 points]**

2.
Two spherical cavities, of radii a and b, are hollowed out from the interior of a neutral conducting sphere of radius R. At the center of each cavity a point charge q_a and q_b respectively is placed.

(a) What is the induced charge on each surface of the conductor?
(b) Sketch the distribution of induced charges
(c) Sketch the electric field lines everywhere in your picture from part (b)
(d) What is the electric field outside the conductor?

[1 point each part]